MYOCARDITIS, WITH SPECIAL REFERENCE TO DISORDERED METABOLISM.*

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Members of the Alumni Association—Ladies and Gentlemen: When your executive committee asked me to deliver the first Toland Lecture, they modified this request by suggesting that the topic should be something clinical, about the heart. The choice of a subject has thus been rendered less difficult, and the responsibility for failure consequent upon such a selection was divided between us.

The subsequent remarks upon treatment of the myocardium do not constitute even an epitome of the whole subject; our endeavor is simply to direct attention to some features in the treatment of heart disease, which seem to be very frequently overlooked among the host of therapeutic measures directed toward the relief of cardiac disturbance. Nothing new is offered; we only look back over the practice of nearly a quarter of a century and see what lessons have been learned; or compare the past with the present and ask ourselves whether in the adoption of new remedies and new methods we have not occasionally discarded older ones of greater value; whether in each and every case the change has meant actual progress.

The heart is the most abused organ in the human body, even more so than the stomach, because when the latter is overworked it rebels and has its own vigorous methods of enforcing its demands for a period of absolute rest; but when the overworking, overtaxed heart, by an attack of palpitation or other form of cardiac distress, advances its plea for a diminution in the strain to which it is subjected, the response only too often comes as a whip of stimulation in the form of alcohol, digitalis, ammonia or some similar agent. The mere allaying of a symptom such as palpitation does not demonstrate that the correct treatment has been used, because it frequently happens that a stimulant will steady the heart's action when the condition of the cardiac muscle demands sedatives and rest; but the promptness of response may deceive one as to the gravity of the situation, and consequently the urging process goes on until the over-driven heart begins to stagger under its efforts, and even then the attendant may fail to recognize the fact that injudicious treatment has simply hastened the development of irreparable myocardial changes.

There is a fascination about the mechanics of the heart that tempts one to regard cardiac disease simply as an indication of a disordered machine without taking into account the condition of the tissues which compose the organ; all symptoms seem to call so loudly for increased or diminished action that there is a liability of adopting a line of treatment which will compel the heart to the performance of its functions without our full cognizance of the condition of the viscus, and it may be without making an attempt to discover or remove the cause of the disturbance; we may be so interested in our endeavors to obtain mechanical effects that we fail to watch the condition of the machine. Much injury may be done by acting upon the idea that a weak heart always demands a cardiac stimulant; in fact, better and more permanent results can be obtained by bringing the demands of the body within the capabilities of the heart rather than by compelling the heart to rise to the demands of the body. Frequently there are patients about 50 years of age suffering from mild cardiac disturbance who are relieved from time to time by means of digitalis or strophanthus, but unfortunately the treatment is allowed to stop at this point, with the result that the distress is allayed only to return, and to return each time after a shorter interval. These are generally cases of incipient muscular change, and it is not improbable that if some effort were made to discover and eliminate the cause of injury to this cardiac muscle the degenerative process might be retarded or even arrested. In thus protesting against the indiscriminate use of cardiac stimulants, and especially of digitalis, I do not wish to be understood as maintaining that digitalis is destitute of nutritive influence; on the contrary the improved circulation through the cardiac muscle must be of great value in restoring tone to the muscular fibres; but there are changes due to constitutional conditions when the heart failure is the result of malnutrition, or of some toxin or product of perverted metabolism circulating in the blood, and the treatment of such cases by digitalis alone is certainly inadequate; in fact, the use of this or any other cardiac stimulant may be positively injurious under such circumstances.

Errors in treatment are more frequently due to mistakes in diagnosis, so far as the detection of murmurs is concerned, than to a failure to appreciate or a neglect to ascertain the state of the cardiac muscle and the existence of conditions detrimental to it. An examination of the heart should be an attempt to ascertain at least four things: (1) the condition of the valvular orifices; (2) the condition of the valve segments; (3) the condition of the cardiac muscle; (4) the causes of the cardiac disturbance. Unless fairly accurate information can be obtained on each of these points the treatment must be haphazard. It is this last point that is most frequently overlooked, and possibly the most important criticism of our treatment of myocardial lesions would be that we are somewhat inclined to neglect any attempt to discover the cause of the lesion, to discover whether it still exists, whether it can be removed, and thus by appropriate measures endeavor not only to restore the heart as much as possible, but also to prevent a renewal of the injurious influences or reduce them to a minimum. It must not be forgotten that many of the waste substances formed within the body are muscle poisons, and that a failure in elimination must therefore be associated with an amount of injury to the different muscles, varying in degree with the intensity and character of the toxic process. Thus in the ordinary bilious attack the patient complains of the muscular weariness in his limbs and the inability, or at least disinclination, to undertake anything requiring physical effort; but it is equally certain that the myocardium also suffers, for the disturbance is always associated with changes in the frequency, tone and rhythm of the pulse. Should this lithemic condition persist for a length of time it is to be expected that functional, and it may even be marked nutritive changes will result, especially when it is borne in mind that the contractile power of the heart is an inherent property of the cardiac muscle fibre, and consequently that anything which interferes with the nutrition of these fibres must disturb their functional activity. Furthermore, it is a well-established fact that the secretions of various glands have a distinct influence upon the heart and that changes in their structure are associated with grave cardiac disturbance; also, there is reason to believe that certain tumors in remote parts of the body tend to produce degenerative changes in the myocardium.

In the face of such facts it is very evident that the treatment of heart disease must have a wider scope than the use of remedies directed to the heart alone, and it is in illustration of this line of thought that the subsequent cases and criticisms are presented. They have been arranged in four groups: (1) Myocarditis due to defective metabolism as a result of disturbance of the alimentary system; (2) cases due to disorder of internal secretions and excretions; (3) cases where the myocardial disturbance is associated with the existence of a neoplasm in some other part of the body; (4) myocarditis as the result of specific

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infectious diseases. The first series of cases illustrates the influence of defective metabolism in producing cardiac disturbance or aggravating an existing lesion.

Case A—A professional gentleman, 50 years of age. Always had been a total abstainer from alcohol and tobacco; the only sickness he had had was typhoid fever, which antedated the very early sensations of cardiac discomfort by eight years. The patient never had been robust, but was of exceptionally active habits, and a great portion of his time was spent in the open air. He stated that for three years he had suffered with angina pains, and that during the last eight or nine months they were a daily occurrence. Trivial exertion, such as walking up a slight incline, would induce an attack, and frequently he had to sit down in a store or upon a doorstep until the pain passed away. Examination showed the pulse regular but slightly below the average strength, the radial arteries were healthy, and careful examination of the superficial vessels failed to show any signs of arterial degeneration. The heart was normal in size, and the only change that could be detected was a diminished intensity of the sounds, with an occasional systolic murmur in the mitral area. His family physician had examined the urine repeatedly, and always found it normal, with the exception of a frequent excess of amorphous urates. The patient had been unfortunate in his medical attendants, as his first physician left that part of the country, his successor died within a year, a local consultant shared the same fate, and the patient ultimately passed into the hands of a young physician, who was hampered by all the traditions in treatment handed down to him from his predecessors by the patient, without any explanation as to why such a line of life had been laid out; and the embarrassment was still further increased, as it was said to be the result of a consultation which was participated in by a well-known European specialist whom the patient had the opportunity of seeing upon two occasions. Under such circumstances the attending physician was loth to make any changes in the general treatment, although the diet puzzled him very much, at is was exceptionally abundant in the amount of nitrogeneous food allowed, while the urine indicated that nitrogeneous metabolism was imperfect. The close resemblance to a strict diabetic diet led me to ask the patient whether sugar had ever been found in his urine, and he replied that at the first consultation a trace was detected, and this diet was prescribed. A second examination, made forty-eight hours after the first, failed to discover any sugar, but nothing was said about the diet, and the patient not knowing why it was prescribed, persisted in its use for more than two years, under the belief that it was given for the relief of his cardiac pain. As his physician sickened and died a few days after the consultation above referred to, there was not anyone to correct the mistake.

We at once advised a mixed diet, in which the proteids were diminished, gave the patient a mercurial and saline every other day for three doses, then ordered him seven minims of wine of colchium, three times daily for about a month, and subsequently he took arsenic and strychnia. The patient began to improve after the first purgative, and at the end of one week could take more exercise than was possible at any time during the preceding two years. He still lives, and continues in the active pursuit of his profession; and although examination shows that his myocardium is weak, he very rarely shows any symptoms of angina, and never experiences the severe suffering which was a frequent occurrence four years ago. I feel sure that but for the unfortunate chain of events which led to his persistency in an injurious dietary for more than two years, his recovery would have been more complete.

Case B belongs to the same class. Briefly stated, the patient was a merchant, 56 years old, but prematurely gray, with well-marked arcus senilis and thickened arterial walls. I was called to see him on account of acute angina attacks, and failed to detect any change in the heart except the accentuated clanging sound in the aortic area (toomp) so frequently heard in cases where there is thickening and slight dilatation of the aorta. Notwithstanding the free use of nitro-glycerin and morphin, together with the administration of iodides and arsenic, the attacks increased both in severity and frequency until the patient dreaded to go to bed, because after a short sleep he would awaken in great pain and have to spend the remainder of the night sitting in his chair. This continued for more than two weeks, when, as he had been taking about a grain and a half of morphin daily, it was thought advisable to give him five grains of calomel, and, to the surprise of everyone, the pain ceased as soon as the calomel acted.

Case C—The third case of this class was a patient 52 years of age, a habitual drinker of whisky, who was suffering from a combination of hepatic cirrhosis and mitral incompetence. The mitral incompetence was of very old standing, but had not given any trouble until during the three years prior to my first visit. Upon examination the patient was found to have a considerable degree of ascites, together with so much dropsy of the lower limbs and feet that he had to wear felt slippers instead of his usual leather shoes. The heart was enlarged so that the apex beat was in the usual interspace but nearly one inch outside the nipple line, and a long systolic murmur could be easily detected in the mitral area. The pulse, moderately full, and although of less than normal tension, was still very much better than one would expect from the dropsical and dyspneic condition of the patient. The superficial abdominal veins were large and prominent, and although considerable ascites was present, the regularly enlarged and tender liver could be easily palpated when the patient was lying upon his left side. There was a small amount of albumen and a few hyaline casts in the urine. The patient informed me that the dropsical condition had existed for more than a year, during all of which time he had been under treatment, the chief remedies having been digitalis, strychnia and purgatives. The case seemed to be so well suited for digitalis that I prescribed it again, under the belief that the former preparations of the drug had not been reliable; but there was very little improvement at the end of two weeks, and consequently the pill of digitalis, squill and bluemass was substituted during one week without obtaining any better results. This experience, together with that of his former attendants, and the fact that the pulse tension, although below normal, was much better than one would expect in such a dropsical condition, suggested the idea that many of the symptoms which had been attributed to the heart were really due to the hepatic cirrhosis, and that the debilitated condition of the heart itself was probably due to the influence of toxins derived from this same source. All cardiac tonics were therefore abandoned, and the patient was given two grains of calomel three times daily for several days until there were signs of approaching ptyalism. Under this treatment the dropsy rapidly disappeared, chiefly by diuresis, the liver became smaller and lost its extreme tenderness, the area of cardiac dullness diminished, and the force of the cardiac contractions increased. Subsequently the patient was given one-fortieth of a grain of strychnia four times daily, and advised to take two grains of calomel once a week for one month. He is now in excellent condition, and has been able to work upon his ranch. The liver is still larger than normal, and the mitral murmur more pronounced than formerly, but this is what one would expect in a valvular murmur when the force of the myocardial contractions had been increased.

Case D—The fourth and last case of this series was noted in a man 50 years of age, who had incompetence of the mitral valve since boyhood, but muscular compensation had been perfect so that he could ride a bicycle or take part in active sports, such as lawn tennis, without suffering any inconvenience. There was a distinct history of gout in his family, although he never had suffered from it. About one year before I saw him he broke down in health, probably from worry and overwork, became very nervous, had frequent attacks of palpitation, lost consciousness on several occasions, and developed other symptoms which suggested the Adams Stokes syndrome, but he could not tell me whether they had been associated with bradycardia. When he walked three or four blocks he had to stop and rest, not on account of dyspnea, but rather because of a sensation which he said was "not pain, but a feeling as if he were tired in his chest just below the breast-bone." The right side of the heart was slightly enlarged, and there was a distinct mitral systolic murmur. The superficial arteries were thickened, but not to a great degree; the pulse was regular, of good tone and volume, and generally averaged from 65 to 70 beats per minute when the patient was at rest. The liver was enlarged. There was not anything abnormal in the urine. My first impression was that the distress was a form of angina due to the changed condition of the blood vessels, and consequently nitro-glycerin was prescribed in doses of 1-100 grain three times daily; but this only succeeded in giving the patient violent headaches, which persisted so long as the drug was continued. The next idea was that his exhausted nervous system was responsible for the trouble, and that all his symptoms might be due to neurasthenia; but rest and bromides failed to give any relief. Strophanthus relieved the attacks of palpitation, but did not improve his condition. It was then discovered that the patient had suffered from hemorrhoids since he was a very young man, and that they bled frequently; furthermore that the present sickness commenced from the time that the hemorrhoids had been removed by operative procedure. This coincidence, together with the gouty history, dietetic habits of the patient, and enlarged liver, awakened the suspicion that cardiac distress might be largely due to imperfect metabolism consequent upon a portal congestion which theretofore had obtained relief through the bleeding hemorrhoids, and that those products of this faulty metabolism were acting as toxins upon a circulatory apparatus which the patient's time of life, diathesis and pre-existing lesion had rendered more than usually vulnerable. One-quarter of a grain of mercury proto-iodid was prescribed three times daily with such satisfactory results that when the patient was seen forty-eight hours later he said, "Doctor, you have hit it this time." He improved rapidly, and frequently walked a distance of between three and five miles; but a change of residence removed him from my care, so that I am not able to furnish further information except the fact that three months ago he wrote to me saying that he was in fair health and able to attend to business.

These four cases are fair examples of what is sometimes described as gouty heart, not because the patient actually suffers from gout, but on account of the relation that is supposed to exist between it and lithemia; in the majority of the cases belonging to this class lithemia is a frequent symptom, but the connection between the two conditions must await a more perfect knowledge regarding the pathology of gout. All we are warranted in saying about lithemia is that it appears to be particularly associated with defective oxidation of nitrogenous food or tissues, and that this should not be attributed merely to functional inactivity of the liver, as was originally suggested, but may also have its origin in excess of nitrogenous food injested, or imperfect digestion in any part of the alimentary tract, so that the food enters the portal circulation in a condition in which hepatic digestion is impossible, and thus acts as an irritant to the liver tissue. Should the consequent impaired hepatic function result in the passage into the general circulation of material that should have undergone further transformation by action of the liver cells, there is every reason to believe that such substances will act as toxins, because it has been shown experimentally that if an anastomosis is established between the portal vein and the general circulation, of a dog, death soon ensues. The idea therefore is that as a result of imperfect nitrogenous metabolism the blood becomes surcharged with nitrogenous waste material which has a toxic influence upon the tissues generally, including the heart; and not only may direct injury be done to the myocardium, but those same toxins tend to raise and maintain a high blood pressure which by and by produces tissue changes in the arterial walls.

It may be argued against this that there are many dyspeptics who have not any heart trouble, or at most a reflex palpitation, and consequently if imperfect metabolism be the cause, or a contributing cause, of the cardiac changes above described, they should be much more common among dyspeptics than they are. The answer to this is that the patient who primarily suffers from gastric dyspepsia is not at all liable to become a victim of imperfect nitrogenous metabolism, because the immediate gastric distress compels him to eat with great moderation, and only substances which can be easily digested. The man who is most liable to suffer from imperfect metabolism is the one who has an appreciative palate and whose stomach, so far as he can judge by his sensations, is capable of digesting all that he swallows; a man's digestive power is not the indication to the amount of food he requires, and just as the dyspeptic may suffer from inanition because he cannot digest enough to supply the wants of his body, so may the other, by using his palate and freedom from gastric distress as guides to the amount of food he should take, ingest more than can be assimilated and consumed in the ordinary wants of the body, and thus have his circulation overcharged with waste nitrogenous material. The four patients that I have referred to were good eaters, two of them were very hearty eaters, and my experience has been that all patients suffering in a similar manner were or formerly had been good feeders.

In people of such dietetic habits there is a tendency to keep the blood continually loaded with a large amount of nitrogenous material, and when a man is young and of active habits much of it is utilized for purposes of tissue growth and repair, so that the injurious effects are delayed or avoided; but soon after reaching adult life the social responsibilities and changing inclinations are generally accompanied by a great diminution in the amount of exercise taken, and a consequent diminished necessity for such a large quantity of food; nevertheless, our customs are such that at this time of life eating becomes one of the social features of our existence, and the dietary, instead of being reduced, is in many cases rendered more difficult. The cardio-vascular changes consequent upon such habits proceed very gradually, and at first imperceptibly, so that the earliest warning of mischief may be an attack of palpitation or precordial distress after a meal that formerly was borne without discomfort, but which is now made intolerable by the incipient degeneration in the heart and blood vessels. After this an improved diet may prevent future attacks, but the early symptoms may have been ignored or misinterpreted so that the heart remains permanently weak and the progress of the ordinary senile changes in the myocardium and arteries is accentuated. The fact that only a comparatively small proportion of people who over-eat suffer from cardiac disturbance does not in any way invalidate the truth of what we have just said; we cannot tell why one man's heart suffers, while that of a gourmand escapes, any more than we can explain why in one man the moderate use of alcohol is followed by nephritis while it not frequently happens that the kidneys of a comparatively excessive and regular drunkard escape injury. All we can say is that each individual has an idiosyncracy according to which the functional capabilities of his different organs and their susceptibilities to injury vary from those of another, a fact that has been recognized by the laity for centuries and recorded in the homely saying, "One man's meat is another man's poison."

It appears to me that the recognition of the noxious influence which chronic deficient metabolism may have over the heart is of very great importance. A review of past experience brings to my mind more than one patient who complained of subjective cardiac symptoms, but where careful examination only revealed a slight chronic congestion of the liver; yet in some cases a few months later, in others three or four years later, the patient returned with unmistakable evidences of dilated heart and chronic myocardial change. These patients I had originally sent away with the assurance that they need not worry, as their hearts were all right, and as there were not any marked symptoms of gastric indigestion, but simply a slight persistent enlargement of the liver, no special instructions regarding diet were given. Of late years I have learned to view such patients with some anxiety, and not simply to pass them by as victims of an overwrought nervous system who only required reassurance.

While the object of to-day's lecture is to discuss these cases in which the cardiac changes are secondary to disturbed alimentation, it is always well to bear in mind the fact that a similar condition occurs where the heart lesion has been primary and failure of compensation leads to passive congestion of the portal circulation with consequent embarrassment of the functional activity of the entire digestive apparatus. A heart should not be regarded simply as a central organ which when out of order produces disturbances in other organs; it should also be remembered that the disordered viscera reflect injuriously upon the welfare of the heart itself, and that any general disturbance of the circulation must interfere with the nutrition of the heart. It therefore follows that not only must the heart itself be treated, but secondary disorders in other organs must be removed simultaneously if compensation is to be restored.

The treatment naturally is considered under the head of diet, exercise and medicines, and, as in this particular group of cases we are dealing with maladies originating in disordered nutrition, we shall discuss the diet first as it is of paramount importance. Since the maladies appear to a great extent to originate in disturbed proteid metabolism, it might seem that the whole matter could be very easily adjusted by reducing the amount of nitrogenous substances ingested, but unfortunately the problem is rarely capable of such easy solution because trouble is not

always due to an excess of nitrogen ingested, but more frequently to interference with its digestion and assimilation, and consequently it behooves us to find out where the flaw is, whether it lies in an excess of nitrogenous food, or the form in which it is taken; or the nitrogenous food may be all right, both in quality and quantity, but the hydrocarbons and carbohydrates are in excess or of such a nature that they disturb digestion and thus prevent the digestion of an amount of proteid material that is absolutely necessary to the best welfare of the patient; or there may be changes in some of the viscera, such as cirrhosis of the liver, which diminishes the activity of the organ, and imperfect metabolism results. The diet therefore should only be prescribed after a careful inquiry into the patient's habits as to food and drink; let him state distinctly the kind of food and the amount of each that he takes at breakfast, lunch and dinner; he must also say how many hours elapse between meals, and whether he is in the habit of eating or drinking between meals. It is only thus that it is possible to determine what constituents of the dietary are responsible for the symptoms and physical signs presented by the patient.

In arranging a diet for these patients it must be remembered that we are dealing with pathological conditions, and therefore that in many instances the ratio of foodstuffs to one another cannot be maintained; also that the quantity must vary with the amount of work which the patient has to perform. Some idea, however, of the approximate amount of food that we should allow the patient, were he in health and following his usual vocation, is of use in enabling us to form an estimate of whether the patient is eating a proper quantity, and how much we should allow him. My usual way is to figure on the basis that a man should have a total daily allowance of food amounting to 1-30th to 1-25th of his normal body weight. The latter quantity is only for those who are doing active bodily work requiring muscular exertion, and consequently, as patients suffering from the maladies we have under discussion are generally passed middle life and not given to muscular effort, the first figure is more frequently appropriate to that age. Again, more than half of this allowance should consist of inorganic food (water and salts), the remainder of organic food (animal and vegetable food), and animal food should comprise only 1-4th of the organic food. Thus a professional man over fifty years of age and weighing 180 pounds would be entitled to 6 lbs. of foodstuff daily, of which 3½ lbs. would be inorganic and 2½ lbs. or 40 ounces organic; the organic would consist of 10 ounces meat (this makes an allowance of about 20 per cent for water in the form of bone, etc.) and 30 ounces vegetables, bread, etc. Nearly every person can tell us approximately the weight at which he feels in best condition, and this I call his normal weight, and upon it base the calculations for his diet. This I have found to be more satisfactory than any system which makes the amount of food the same for all men, irrespective of size and individual idiosyncracy; we must remember that it is natural for some men to be stout, and any attempt to reduce them below a certain weight is accompanied by poor health, while others are naturally of a spare build, and attempts to fatten them are not only futile, but induce gastric disturbance and general malaise.

Having in this way obtained an approximate idea of the quantity of food necessary for the individual patient, we can compare with it the amount which he is accustomed to eat daily, and see whether there is anything wrong in the total quantity or in the proportions of the different varieties; errors in either of these respects must be corrected, and it will be necessary to make special modifications where there is disturbance of the digestive viscera. Thus, as in case "C," where the whole alimentary system was "on strike," it may be necessary to put the patient on milk diet until there are indications of a peaceful settlement and a return of more harmonious action; but in cases such as "D," where digestion was good and the man was eating excessively of all kinds of food and too much albumenoids (he ate meat at every meal), it was only necessary to curtail and rearrange his whole diet.

While it is therefore necessary to arrange the diet according to each individual, there are certain instructions which may be given to all regarding articles of food to be avoided, intervals between meals, and other matters that are of great importance to secure perfect digestion and metabolism. (1) The daily amount of food should be divided into three meals, all nearly equal in quantity; but the articles that are most difficult of digestion should be taken at the midday meal, and the lightest in the evening. The custom of making one very hearty meal in the day, especially in the evening, while breakfast consists of a little fruit, and lunch of a cup of soup and a biscuit, is to be condemned, both because it overcharges the blood with a large amount of nitrogenous waste at one time, and also for the reason that stomach will not have time to complete digestion and empty itself before the patient retires to rest; if on the other hand, the amount of food is divided up more equally throughout the day, then the waste matter in the circulation is never more than can be excreted. (2) The meals should never be less than four hours apart, so that the stomach can empty itself and rest for some time before it is called upon to dispose of more ingestion. (3) No food should be taken between meals. (4) A glass of hot water should be taken every night upon retiring, as this is the best way of flushing not only the stomach, but also the liver. (5) Alcoholic stimulants should be avoided, if possible, but if they must be given, then whiskey and water, or a light Moselle wine are to be preferred. Champagnes, sweet or heavy wines should be forbidden.

Exercise is beneficial in the treatment of this malady, not only on account of a direct influence upon the heart by increasing circulation through the coronary arteries, and thus promoting the nutrition of the myocardium, but also for the reason that the respiration and general circulation are improved so that metabolism is more complete and the whole body benefited. Yet a little common sense must be used in prescribing exercise, for many patients require rest, and in all the amount of exercise must be carefully regulated, as much harm has been done by its injudicious use. It is an unfortunate fact that there are many extremists in medicine who pounce upon everything new in the way of treatment, apply it to every case indiscriminately, and bring it into disrepute. Stokes, who was one of the earliest to recognize the value of this therapeutic method, went so far as to compel a gentleman suffering from aortic regurgitation to run behind his own carriage; under the fresh impulse given by the writing of Oertel, many patients were inadvisedly urged to efforts which only resulted in their complete undoing; and within the last few years we have all seen how the Nauheim treatment introduced by Schott has, in the hands of many, become nothing more nor less than a professional fake. Exercise never should be prescribed until by observation the capabilities of the myocardium have been fairly estimated, and then a very sharp line should be drawn between exercise and exertion.

The amount of exercise to be allowed must be estimated according to the individual ability of each patient, but in all of them everything approaching effort, especially sudden effort, should be absolutely forbidden; apart from this the best guide is the production of dyspnea. It is better to tell the patient that any tendency to breathlessness means that he

is doing too much, and consequently that he must rest until fully recovered, and then continue more slowly. This is very important, because there is a very prevalent idea among young men and boys with athletic aspirations that they can "improve their wind" by persisting in an effort when their hearts are already taxed to the utmost limit; and unfortunately the same notion exists among men of middle life who have become fat through overeating and sedentary habits, so that they undertake some task for which they are wholly unprepared, and bring on an attack of heart failure which not infrequently proves fatal. Those patients who cannot take a few steps without inducing dyspnea are not fitted for active exercise, and must be treated by rest, massage and passive movement until the myocardium has recovered sufficiently to permit the employment of resistance movements, and subsequently light forms of active exercise may be prescribed. The Nauheim treatment, with its combined system of baths and gymnastics, is particularly well adapted to this class of cases, not only because of the direct influence upon the heart and blood vessels, but also for the reason that the improved circulation, through the lungs, liver and kidneys, indeed throughout the entire body, conduces to more perfect metabolism and elimination of waste material, and in this way attacks the disease at its origin. Much discredit has been brought upon this method by the haphazard way in which it is sometimes carried out; for while there is only a small proportion of patients to whom it will not be of at least temporary benefit, still there are a few to whom it is wholly inapplicable; furthermore, what is equally important, the directions regarding the strength, duration and frequency of the baths, as well as those relative to the extent and character of the gymnastics, should be the result of a study of the capabilities and requirements in each case, and not simply a perfunctory turning of the patient over to an attendant, with the instructions that he is to have a Nauheim bath, as if it were of no more importance than having his face sponged.

(*To be continued.*)

TREATMENT OF TYPHOID FEVER.

Outline of Treatment and Results in some of the Cases of the Palo Alto Epidemic of 1903.

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THE OBJECT of the present paper is to give in some detail the treatment of the cases that came under my observation during the epidemic at Palo Alto and Stanford University last spring. Some unusual opportunities were presented to observe, within a short space of time, a considerable number of cases, and as a fairly uniform plan of treatment was adopted and seemed to be generally successful, it may be of value to review it. In the first place some of the difficulties to be met with should be mentioned, for, just as this epidemic came down suddenly upon a wholly unprepared community, so may almost any other community, large or small, be suddenly called upon to face a similar situation. Particularly is this true with our present "happy-go-lucky" control of water supplies, dairies, vegetable gardens, oyster beds, etc. A university community is especially unfortunate when called upon to meet a typhoid epidemic, as it contains so many individuals of susceptible age, the majority of whom are living away from the ordinary facilities of home in the matter of protection, nursing and food. Besides, students are very prone to take poor care of their health, and so pay but little attention to such symptoms as frequently inaugurate typhoid fever.

I have briefly traced the general plan of management adopted in the present epidemic.* Where no hospital facilities are to be had they must at once be instituted for the proper care of typhoid fever. I am fully convinced that the most essential thing in the treatment of typhoid is prompt recognition of the condition, and immediate rest in bed, with proper food and care. Without exception, the fatal cases and the most serious ones that came under my observation, were in persons who had, for one reason or another, kept up and about and eaten improper food after the onset of the symptoms. This was particularly striking in some of the fatal cases. For this reason, above all others, the typhoid fever suspect must at once, and with as little transportation and strain as possible, come under proper care, and stay there until freed from the suspicion of the disease or well again after the fever. In the present epidemic we found it very convenient to group the patients in certain houses or portions of buildings used for residence (dormitories, for instance), and to organize there an emergency hospital, with trained nursing staff and equipment.

Where this was not possible, and cases could not be sent to the hospital without serious risk, they were treated where they were when taken ill. In every case where a typhoid suspect or patient is transported, he should be treated as an ambulance patient in every sense of the word. A trained nurse is indispensable in the care of a typhoid case, from the standpoint of the patient, the family, the community, and, above all, the physician himself. The cases considered in this paper were all cared for by trained nurses, sometimes three for one patient, and sometimes two or more for several patients. One great advantage offered by the grouping of cases together, is the opportunity for several nurses to be present in case of an emergency. Each nurse, whether at a private house or in an emergency hospital, had at her command written orders for everything that was to be done, and was supplied with an emergency outfit for collapse, hemorrhage, perforation, etc.; written instructions of what to do for expected complications, and a list of the more prominent symptoms of each were given her. For every case of typhoid it may seem exaggerated care to have on hand and ready for immediate use the necessary drugs for the various complications, a simple saline infusion outfit, etc., but it saved several lives for me in handling these cases, and I have a wholesome fear of the drug-store delay. It is not only ideal, but absolutely necessary to give each private patient the advantages that come with a well-equipped hospital.

The first and last great problem of every typhoid case is the selection of proper food from the onset of the symptoms until complete health is restored, and that is, as a rule, not until several months have passed. Whenever possible, good unskimmed milk was given. The patient must be carefully studied as to milk digestion. Some did better with two-hourly feedings, some three-hourly or four-hourly; some could best be fed throughout the night; some required a long interval of rest for the stomach. No absolute rule could be laid down as to quantity or intervals of feedings.

A careful study of general nourishment, stools, tongue and abdomen soon makes the best plan clear. Various measures were adopted to suit the milk to the individual taste and digestion of the patient. I learned to look with great concern upon the patient who, in spite of various modifications, was never able to digest milk properly. The addition of limewater, sodium bicarbonate (sol ʒi to Oii) in varying amounts; peptonization, the breaking up of the curd by means of small amounts of babies' foods, the simple dilution with water, the use of broken-up junket, often aided in accommodating the patient to milk. In other cases small amounts of coffee were useful in increasing the palatability of the milk, and the contained caffein had a satisfactory systemic effect. Toast-milk, made by pouring hot milk over thoroughly browned toast and carefully straining it;

*Occidental Medical Times, July, 1903.